Project Assessment and Evaluation Plan (PAEP) Outline
Flood Attenuation and Floodplain Protection

Mill Creek Wetland Restoration

I. Project Summary

A. Funding Program: *This Project is funded by Proposition 50 Coastal Nonpoint Source Program (CNPS).*

B. Project Description: *The City of Millstone (City) will purchase the remaining center acre of a 124-acre piece of land along the mainstem of Mill Creek, which drains to the Ocean. This tributary is the main channel that salmon and steelhead enter when returning to the Northern and Southern tributaries during fall runs. Through this project, the City will restore the entire 124-acre track to its original condition, to provide flood attenuation, floodplain protection, and restore salmonid habitat.*

C. Problem Statement: *At the base of the Mill Creek watershed, Millstone, a medium sized port town, was established in the 1800's. Shippers found it an easy access point from which to sell and buy goods. Many fishermen also called Millstone home, and made a living catching various fish around the port. Salmon have historically used the Mill Creek watershed as a main conduit for travel to reach their spawning headwaters above Northern and Southern Mill Creek.*

Since the 1800's, Millstone has grown from a medium sized port town to a large industrial city. As a result of urbanization, the historic estuary that once was home to many birds and wildlife and offered flood protection, has diminished to half its historic size. The berms that protect this now booming metropolis are growing old. The fishing is not what it used to be, and the number of birds and wildlife are dwindling, as a result of lack of habitat.

The City has recently come to the conclusion that with the decline in the fisheries industry, tourism, and threat of failing levees, this growth is not sustainable and is now working to acquire land in the floodplain. This project is part of the City's overall plan to provide flood protection, preserve open space, and restore fisheries habitat.

i. Identify or characterize baseline data

Baseline data includes county aerial photos taken every 5 years over the past 50 yrs., GIS digitized wetland areas from 1996, 1900's fish processing numbers, Department of Fish and Game last 20 years

spawning surveys, and 10 years of water quality data from USGS stations upstream and downstream of the site.

ii. Identify pollution source categories

Wetland restoration will provide flood protection and habitat, and reduce other upstream pollution sources. This pollution includes, urban runoff from pesticides, fertilizers, and heavy metals from water recycling, along with nitrogen & sediment from the Northern Mill Creek Watershed.

iii. Identify and describe current restoration activities; Best Management Practices (BMP's); Load reduction activities; Prevention activities

The city has required all property within 2 miles of the designated estuary property, be rezoned as the property becomes available for sale. A conservation fund has been set up, from which various sources contribute. Among these sources are CEQA mitigation funds from past projects. This fund has been used to purchase back the sold land for fair market value once it became available. The same fund will be used to purchase the remaining piece of land.

iv. Describe the manner in which the proposed best management practices or management measures will be implemented

The 1 acre section of land will be purchased at appraised value. The project will then research the best design for the 124 acres to provide the most effective habitat, water quality, flood protection, and flood attenuation. The plans will be drawn up and the best plan will be chosen. Construction will then occur. The old building wreckage, *concrete bases, old drainage pipes, and remaining warehouse will be removed. Berms will be placed on the border of the east side of the 124 acre property using material from the berms on the west side. Native seed from surrounding wetlands will be brought in to speed the restoration process.*

v. Summarize how the effectiveness of proposed practices or measures in preventing or reducing pollution will be determined

Water quality is monitored from a USGS station upstream and downstream of the site. Data will be compared before and after the project. The restoration itself will be monitored over the next 10 years. Soils, hydrology, and plants will be surveyed to make sure the ecosystem comes back. Wetland health will be monitored and rated. Flood protection will be estimated by determining storage through post- construction surveys and measurement of stage levels. A model will be used to determine yearly flood storage and storm protection.

vi. Determine "Changes in flow pattern" in affected water bodies

The USGS Stations will monitor flow readings before and after wetland creation. Precipitation, high water tides, and water storage will all be determined through modeling before the wetland is created. The wetland will then be created. Surveying be performed to compare the estimated model with the actual numbers.

vii. Determine economic benefits of implementing project

Economic benefits include flood protection, flood attenuation, fisheries enhancement, and tourism investment. Millstone tourism business has always been a prominent part of the city, with historic downtown shops, famous breweries, and candy production plant; 15% of the economy is generated by tourism dollars. However, with the new demand for ecotourism, new ecotour businesses are drawing even more people to the town with tours of the Millstone estuary, nature walks, canoe trips, kayaking, whale watching, and private charters for salmon fishing. Adding to the estuary will help this new tourism to continue to grow, and may reach upwards of 20% of the cities economy.

D. The Following Project Activities or Tasks will be Completed to Address the Issues or Problems*:*

Task 1. Project Management and Administration. Provide all technical and administrative services as needed for Project Completion; monitor, supervise, and review all work performed; and coordinate budgeting and scheduling to ensure the Project is completed within budget, on schedule, and in accordance with approved procedures, applicable laws, and regulations.

Task 2. Purchase the Land

Have the land appraised and purchase the land for fair market value.

Task 3. Complete all CEQA and Permitting

Obtain all required permits from the designated agencies.

Task 4. Design the Wetland

Using a modeling program, past construction maps, and surrounding environmental details, design a wetland area that will provide the most water quality, habitat, flood attenuation, and floodplain protection benefits, at a reasonable cost.

Task 5. Construction

Remove all old building wreckage, concrete bases and the remaining warehouse from the land. Regrade the land, using the design plans. Dredge fill material from on site, including the current berm, to build the new berm.

Task 6. Post Construction Surveying

Verify post-construction elevations match the design and pre-construction model.

Task 7. Reseed and Replant with Native vegetation

Use surrounding native plant material to accelerate the restoration process through reseeding and transplanting.

Task 8. Monitoring, (Survey the Wetland & Water Quality)
Survey the wetland each year during the dry and wet season. Monitor the wetland health by characterizing soils, hydrology, and plants. Monitor water storage and water quality.

Task 9. Calibrate the model with real time data
Compare the real wetland data with the modeling data. Calibrate the model to the wetland. Using real time data, predict future wetland health and estimate load reductions, habitat benefit, floodplain protection, and flood attenuation over the next 40 years.

Task 10. Reporting Expeditiously provide, during implementation or upon completion of the Project and thereafter during the Useful Life of the Project, such reports, data, and information as may be reasonably required by the State Water Board's Project Representative, including but not limited to material necessary or appropriate for evaluation of the State Water Board's program or to fulfill any reporting requirements of the state government. Examples of these include:

(A) Progress Reports. Submit quarterly progress reports during Project Implementation. The description of activities and accomplishments of each task during the quarter shall contain sufficient detail to provide a basis for payment of invoices and shall be translated into percent of task work completed for the purpose of calculating invoice amounts.

(B) Project Assessment and Evaluation Plan. Shall provide data consistent with the format, schedule and other guidelines specified and shall be approved by the State Water Board's Project Representative.

(C) Final Project Summary Report. Submit to the State Water Board's Project Representative a copy of a Final Project Summary Report within 60 days following Project Completion.

Category of Project Activities or Tasks:

Tasks	**Category**
1. Project Management & Administration	Planning, Research, and Assessment
2. Purchase the Land	Flood Attenuation and Floodplain Protection
3. Complete All CEQA & Permitting	Planning, Research, and Assessment
4. Design the Wetland	Planning, Research, and Assessment
5. Construction (Building Removal, Land Grading & Berm)	Flood Attenuation and Floodplain Protection
6. Post Construction Surveying	Planning, Research, and Assessment
7. Reseed & Replant with Native vegetation	Habitat Restoration
8. Monitoring (Survey the Wetland & Water Quality)	Planning, Research, and Assessment
9. Calibrate the Model with Real Time Data	Planning, Research, and Assessment
10. Reporting	Planning, Research, and Assessment

II. Project Goals & Desired Outcomes

(Goals are to occur by the end of the project and be performed by Millstone (the City) unless stated otherwise.)

The goals of this project:

1. *Purchase the remaining acre of floodplain land from Pacific Packaging with Conservation Fund money within the first six months of the project to be used for floodplain protection.*

2. *Construct a wetland that reflects the best representation of the design specifications to provide for floodplain protection and flood attenuation.*

3. *Construct a 124 acre wetland that provides 186 acre feet of storage for flood attenuation and protection.*

4. *Provide 390 acre-feet of water storage in one continuous corridor of wetland habitat in the event of a flood for flood attenuation.*

5. *Produce a wetland with stable native vegetation within 20 years of planting that provides a breaker which on average slows the velocity of water by 3% in winter storm surges for floodplain protection.*

The desired outcomes of this project are:

1. *The last needed acre of the 124 acres of land under the ownership of the City by the first six months to be used for floodplain protection*

2. *A wetland on the ground that reflects the best representation of the design specifications in order to provide the best flood plain protection and flood attenuation.*

3. *A wetland that provides 186 acre-feet of protection against flooding.*

4. *A flood catchment area that is large enough to hold 390 acre-ft of water storage in the event of a flood.*

5. *A wetland with stable native vegetation within the 20 years of planting that provides a breaker, which on average slows the velocity of water in winter storm surges by 3%.*

III. Project Performance Measures Tables

Table 5
Flood Attenuation and Floodplain Protection
Mill Creek Wetland Restoration

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
1. Purchase the remaining acre of floodplain land from Pacific Packaging with Conservation Fund money within the first six months to be used for flood protection.	1. The acre of land under the ownership of the City by the first six months to be used for floodplain protection.	1. Escrow Paper Work 2. Records of funds transferred from the Conservation Fund to Pacific Packaging. 3. Property appraisals.	1. The Deed to the land with the City's signature	1. Calendar & Deed- Has the deed been signed 6 months after contract approval? Yes-met goal, No-didn't	1. A Deed signed over to the City 6 months after contract signature.
2. Construct a wetland that reflects the best representation of the ideal design specifications to provide for the best floodplain protection and flood attenuation	1. A wetland that reflects the best representation of the design specifications (see planning table for goals of ideal design specifications) in order to provide the best flood plain protection and flood attenuation.	1. Check forms/notes from 3 horticulturalists. 1. List of horticulturalists that reviewed the wetlands. 2. Check forms/notes from 3 hydrologists. 2. List of hydrologists that reviewed the wetlands. 3. Check forms/notes from 3 soil scientists. 3. List of soil scientists that reviewed the wetlands.	1. Number of wetlands that incorporate the plants as specified in the PDS, as seen by 3 project horticulturalists. 2. Number of wetlands that incorporate the hydrology as specified in the HDS, as seen by 3 project hydrologists. 3. Number of wetlands that incorporate the soil as specified in the SDS, as seen by 3 project soil scientists.	1. Tools: Plant Design Specs. (PDS) Method: Use the PDS to compare to the finished project to see if the finished project represents the PDS. 2. Tools: Hydrology Design Specs. (HDS) Method: Use the HDS to compare to the finished project to see if the finished project represents the HDS. 3. Tools: Soil Design Specs. (SDS) Method: Use the SDS to compare to the finished project to see if the finished project represents the SDS.	1. A wetland that incorporates the plants as specified in the plants design specifications, as seen by 3 project horticulturalists. 2. A wetland that incorporates the hydrology as specified in the hydrology design specifications as seen by 3 project hydrologists. 3. A wetland that incorporates the soils as specified in the soil design specifications as seen by 3 project soil scientists.

Table 5 (Continued)
Flood Attenuation and Floodplain Protection
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Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
3. Construct a 124 acre wetland that provides 186 acre-feet of protection against flooding for flood attenuation	1. A wetland that provides 186 acre-feet of protection against flooding.	1. Number of transects taken. 1. Average depths of water across each transect.	1. Number of acre-feet of protection against flooding for flood attenuation.	1. Tools:-Wetland 3-D (Model) Method: Transects will be taken after the grading. A 3-D model will be built using the dimensions of the wetland project and the flow data. The acre-feet storage will be determined	1. 124 acre wetland that provides 186 acre-feet of protection against flooding for flood attenuation
4. Provide 390 acre-feet of water storage area in one continuous corridor of wetland habitat in the event of a flood for flood attenuation. .	1. A flood catchment area that is large enough to hold 390 acre-ft of water storage in the event of a flood.	1. Pages of past depth and flow records 2. Wetland area that links to the new wetland. .	1. 390 Acre-Feet of water storage area in one continuous wetland habitat corridor.	1. Tools: GIS Aerial Photos Past Depth and Flow Records of Historic Wetlands, and New Estimates of the constructed wetland. Method: Map the wetland habitat in the City using GIS to determine what areas are continuous. Using past historic wetland records determine the storage within the historic wetlands that link to the new wetland and add the new numbers determined from the constructed wetland.	1. Provide 390 acre-feet of water storage area in one continuous corridor of wetland habitat in the event of a flood for flood attenuation.

Table 5 (Continued)
Flood Attenuation and Floodplain Protection
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Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
5.) Produce a wetland with stable native vegetation within the 20 years of planting that provides a breaker which on average slows the velocity of water in winter storm surges for floodplain protection.	1. A wetland with stable native vegetation that provides a breaker, which on average slows the velocity of water in winter storm surges by 3%.	1. Pages of Data Collected 2. Number of Plots sampled.	1. Percent change in velocity of water over the 20 years.	1. Tools: Measuring stick, stakes, ropes, flow and wind instrumentation. Methods: Set up transects. Determine average plant growth each year. Measure average flow and average wind speed during winter storms. Compare the flow measurements over 20 years, while considering wind speed.	1. A wetland with stable native vegetation within the 20 years of planting that provides a breaker, which on average slows the velocity of water in winter storm surges by 3%.